

## Claims

What is claimed is:

- [c1] A touch probe for a coordinate measuring apparatus, comprising:
- a touch probe chassis adapted to be attached to the coordinate measuring apparatus;
  - a support for a sensing stylus which is mounted on the touch probe chassis so as to be deflectable from a rest position and on which the sensing stylus is mountable for contacting a workpiece;
  - a deflection measuring system for detecting a deflection of the support for the sensing stylus with respect to the touch probe chassis; and
  - an inspection optics separate from the deflection measuring system, for the inspecting a tip of the sensing stylus and a region around the tip;
- wherein at least one of the components support for the sensing stylus and touch probe chassis comprises a transverse support which extends transversely to a direction of extension of the sensing stylus and which is transparent to light in at least a portion thereof and which is disposed in a beam path of the inspection optics.
- [c2] The touch probe according to claim 1, wherein the sensing stylus is mounted on the support for the sensing stylus, and wherein an object plane of the inspection optics is disposed in a region of the tip of the sensing stylus.
- [c3] The touch probe according to claim 2, wherein a first distance D1 between the transverse support and the object plane, and a second distance D2 between the transverse support and the tip of the sensing stylus satisfy the following relation:
- $$0.5 < |D1/D2| < 2.0.$$

- [c4] The touch probe according to claim 1, wherein the transverse support is disposed between an objective lens of the inspection optics and a tip of the touch probe.
- [c5] The touch probe according to claim 1, wherein the transverse support is made of a transparent material.
- [c6] The touch probe according to claim 1, wherein the transverse support comprises at least one aperture for a passage of light to the inspection optics, wherein, in particular, a plurality of apertures are distributed in a circumferential direction about a longitudinal axis of the sensing stylus.
- [c7] The touch probe according to claim 1, wherein at least one of the support for the sensing stylus, and a connecting region between the support for the sensing stylus and the touch probe chassis are disposed within the beam path of the inspection optics.
- [c8] The touch probe according to claim 1, wherein the sensing stylus extends substantially along a main axis of the inspection optics.
- [c9] The touch probe according to claim 1, wherein the transverse support is elastically deformable and elastically couples the touch probe chassis and the support for the sensing stylus.
- [c10] The touch probe according to claim 9, wherein the touch probe chassis and the support for the sensing stylus are integrally made from one block of material, in particular, from a monocrystal.
- [c11] The touch probe according to claim 9, wherein the touch probe chassis and the support for the sensing stylus are integrally made from a monocrystal.

- [c12] The touch probe according to claim 9, wherein the deflection measuring system detects an elastic deformation of the transverse support to determine the deflection of the support for the sensing stylus with respect to the touch probe chassis.
- [c13] The touch probe according to claim 12, wherein the deflection measuring system comprises at least one strain sensor to detect the elastic deformation of the transverse support.
- [c14] The touch probe according to claim 12, wherein the deflection measuring system comprises at least one strain sensor of a piezoelectric material to detect the elastic deformation of the transverse support.
- [c15] The touch probe according to claim 12, wherein the deflection measuring system comprises at least one resistance strain gauge to detect the elastic deformation of the transverse support.
- [c16] A coordinate measuring apparatus comprising a workpiece mount and a touch probe which is movable in space with respect to the workpiece mount and is adapted for contacting a workpiece mountable on the workpiece mount, wherein the touch probe comprises:
- a touch probe chassis,
  - a support for a sensing stylus which is mounted on the touch probe chassis so as to be deflectable from a rest position and on which the sensing stylus is mountable for contacting a workpiece,
  - a deflection measuring system for detecting a deflection of the support for the sensing stylus with respect to the touch probe chassis, and
  - an inspection optics separate from the deflection measuring system, for the inspecting a tip of the sensing stylus and a region around the tip,
- wherein at least one of the components support for the sensing stylus and touch probe chassis comprises a transverse support which extends transversely to

a direction of extension of the sensing stylus and which is transparent to light in at least a portion thereof and which is disposed in a beam path of the inspection optics.

[c17] A method of contacting a workpiece, comprising:

providing a coordinate measuring apparatus comprising a workpiece mount with the workpiece mounted thereon and a touch probe which is movable in space with respect to the workpiece mount, wherein the touch probe comprises:

a touch probe chassis,

a sensing stylus

a support for the sensing stylus which is mounted on the touch probe chassis so as to be deflectable from a rest position,

a deflection measuring system for detecting a deflection of the support for the sensing stylus with respect to the touch probe chassis, and

an inspection optics separate from the deflection measuring system, for the inspecting a tip of the sensing stylus and a region around the tip,

wherein at least one of the components support for the sensing stylus and touch probe chassis comprises a transverse support which extends transversely to a direction of extension of the sensing stylus and which is transparent to light in at least a portion thereof and which is disposed in a beam path of the inspection optics;

and wherein the method comprises:

moving the touch probe relative to the workpiece in space, in particular, step-by-step, to bring the tip of the sensing stylus into contact with the workpiece at a desired location,

enabling during the movement a user inspection of the position of the tip of the sensing stylus with respect to the workpiece by means of an inspection optics,

changing a moving path of the touch probe relative to the workpiece in dependence upon at least one user input.